No fibres get into the opposite pyramid by way of the corpus callosum.

Stimulation with absinthe shows that the bulbo-spinal centres (including the cerebellum) alone, can produce a series of clonic fits, differing from the cortical in the much slower rhythm of the contractions. But from the complete section of the cord experiments it seems improbable that the cord alone can be excited by absinthe.

Immediate hemisection of the cord prevents the absinthe fit on that side; but after recovery a modified fit results upon the side of the lesion, in spite of the fact that the direct lateral and crossed pyramidal tracts are completely degenerate, as well as the internuncial fibres in the anterior and lateral columns.

When one hemisphere is removed or a complete hemisection made in the quadrigeminal region, there are bilateral fits, in spite of the fact that one pyramidal system is completely degenerate. The fits are modified upon the side opposite to the lesion, the clonus being less marked, and the first fit being absent or very small.

If, in the last two cases, a hemisection is made upon the side of the degenerate pyramid, it instantly arrests the fits upon that side, the section interrupting the sound direct pyramidal tract.

I therefore conclude that the maximal effect of absinthe is produced when the motor area is present, and that the impulses generated there are distributed by the pyramidal system in the way described, the maximal effect crossing to the opposite side, the question of unilaterality or bilaterality being one of degree as shown by the differences between the initial and subsequent fits, and as borne out by the relative sizes of the crossed and uncrossed tracts.

The epilepsy due to absinthe indicates that there are probably very many epileptiform attacks in man which are toxic.

VI. "A Research into the Elasticity of the Living Brain, and the Conditions governing the Recovery of the Brain after Compression for Short Periods." By A. G. Levy, M.B. (London). Communicated by Professor Horsley, F.R.S. Received February 21, 1894.

(From the Laboratory of the Pathological Department of University College, London.)

(Abstract.)

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In view of the great frequency of compression of the brain as a pathological condition, it seems very advisable to attempt to obtain

some knowledge of the elementary factors conditioning the physical changes in the brain substance due to mechanical pressure.

Grashey* has already definitely proved that the coefficient of compressibility of the dead brain is slightly less than that of water, which is equivalent to saying that under any ordinary pathological conditions the brain tissue is incompressible. At the suggestion of Professor V. Horsley, who devised an apparatus for the purpose, and to whom I am indebted for advice and suggestions, an attempt was made to determine the elasticity of the living brain, *i.e.*, of the brain mass with its full complement of circulating blood and lymph, and further to test the truth of the generally accepted view that the elasticity of the brain is proportional to the blood pressure.

The brain was experimented upon *in situ*, the influence of the cerebro-spinal fluid being excluded by the mere fact of the skull being opened and the membranes partially reflected, thus releasing the fluid from all tension. Thus we arrive at the properties of the brain mass itself as it rests upon its osseous enclosure.

There were, in the first place, considered the results of experiments performed upon freshly-exposed brains, the blood pressure being at its normal height, in order to arrive at some conclusion as to the normal elasticity of the brain. The downward movement of a plunger was measured after a given interval of time, and the extent of this is termed the "excursion." The recovery of the brain surface, to the extent of which the term "recoil" is applied, was measured until it failed to perceptibly develop further. The general character of the excursion is that of a rapid plunge downwards taking place within the space of one or two seconds, followed by a much more gradual compression. Its extent varies within a considerable range in different animals; thus a weight of 50 grams applied for one minute produces an excursion which varies in different dogs from 4·5 to 7·3 mm. It also varies notably with the weight employed. There is no obvious relation between the depth of excursion and the blood pressure.

For convenience of expression and of comparison the ratio of the excursion to the recoil is in the full paper expressed in the form of a fraction, and this ratio is termed the "proportionate recoil;" the smaller this fraction the feebler the elastic reaction it denotes, and *vice-versâ*. A comparison of the ratios derived from experiments performed under like conditions upon different animals brings out the striking approximation which they bear to one another, whatever the length of the excursion and whatever the existing blood pressure may be. And such deviations from the average as the ratios present cannot be found to have any relation to variations in either excursion or blood

* Grashey, "Ueber Hirndruck und Hirncompression." 'Allg. Ztschr. f. Psychiat.,' Berlin, 1887, vol. 43.

pressure. A compression by a 50-gram weight for a period of from 30 seconds to one minute yields an average proportionate recoil of $\frac{1}{2}$. A further comparison definitely shows that the longer the period of compression the less is the recoil; thus with a compression of only two seconds the reaction is sometimes almost perfect, whereas a compression lasting six miuutes yields a ratio of 1/2·74. Heavier weights similarly damage the brain in a fashion prejudicial to its recovery.

A series of experiments were performed with a view to comparing the "elasticity" of the brain at the normal blood pressure with the "elasticity" of the same brain at an artificially lowered blood pressure. The first method employed was that of producing a large fall of blood pressure by bleeding. The results tended to confirm the impression that there exists no constant relation between brain elasticity and blood pressure. This series is somewhat vitiated by the partial collapse of the cerebrum which ensues during the process of bleeding, and a second series was instituted, in which the blood pressure was lowered through the agency of amyl nitrite; the brain at the moment of administration becoming flushed with blood, it has no tendency to collapse. Under the influence of this drug the cerebral vascular conditions are such that the "elasticity" is actually increased, thus conclusively demonstrating the non-dependence of the latter upon the central arterial pressure.

A further series of experiments were performed in view of the influence which venous pressure is believed to exert upon the cerebral circulation. This object was carried out by exposing the accessible cranial veins and clamping them in succession, and by measuring the variation in the intra-cranial pressure induced by this means. The results tended to show that the increase of intra-cranial pressure must be considerable to influence the "elasticity" in even a small degree.

Experiments performed upon brains which had undergone prolonged or severe compression showed that a considerable increase of arterial blood pressure is quite unable to restore the volume of the brain thus damaged, whereas an increase of venous pressure, obtained by asphyxiation, rapidly, and usually completely, brings this about.